

Simultaneous PMC and PMSE observations with a ground-based lidar and SuperDARN HF radar over Syowa Station, Antarctica

SUZUKI, Hidehiko^{1*}, NAKAMURA, Takuji¹, EJIRI, Mitsumu¹, OGAWA, Tadahiko², TSUTSUMI, Masaki¹, ABO, Makoto³, KAWAHARA, Taku D.⁴, TOMIKAWA, Yoshihiro¹, YUKIMATU, Akira S.¹

¹National Institute of Polar Research, ²National Institute of Information and Communications Technology, ³Tokyo Metropolitan University, ⁴Shinshu University

A Rayleigh-Raman lidar system had been installed by the 52nd Japanese Antarctic Research Expedition on February, 2011 at Syowa Station Antarctica (69.0°S, 39.5°E). Polar Mesospheric Cloud (PMC) was detected by the lidar at 22:30UT (+3hr for LT) on Feb 4th, 2011, the first day of a routine operation. This event is the first time to detect PMC over Syowa Station by a lidar. In the same night, SuperDARN HF radar with oblique incidence beams also detected Polar Mesosphere Summer Echoes (PMSEs) during 21:30UT to 23:00UT. Although these signals were detected at different times and locations, PMC motion estimated using horizontal wind velocities obtained by a collocated MF radar strongly suggests that they have a common origin (i.e. ice particle). We consider that this event occurred in the end of PMC activity period at Syowa Station in the austral summer season (2010-2011), since the lidar did not detect any PMC signals on other days in February, 2011. This is consistent with satellite-born PMC observations by AIM/CIPS and atmospheric temperature observations by AURA/MLS instruments.

Keywords: polar mesospheric cloud, polar summer mesospheric echo, PMC, PMSE, lidar, HF radar